### *Public-Private Collaborations*

Collaborative S&T activities may involve public institutions, such as government agencies and universities, as well as other nonprofit research organizations. Activities include transfer of technology from Federal laboratories and universities, small business S&T programs, and the Advanced Technology Program. See sidebar, "The Advanced Technology Program: 1990–2000 Trends."

**Federal Technology Transfer Programs.** In general, technology transfer can be defined as the exchange or sharing of technology or technical knowledge across different organizations. It can take place in a number of scenarios: in public or private research collaborations (the focus of this section), in fee-based transactions (licensing and trade), and in training or hiring activities. The role of Federal agencies and laboratories, either as a source of technology to be commercialized by private parties or as a research partner, is considerable given substantial Federal R&D activity, as described earlier in the chapter. Public policy objectives for Federal cooperative research and technology transfer activities include the support of mission objectives such as defense, public health, and the promotion of competitiveness and economic growth (Bozeman 2000). One common technology transfer mechanism is a license that confers rights to exploit commercially a patented or otherwise proprietary technology. Other technology transfer mechanisms include cooperative agreements, personnel exchange, user facility agreements, and technical assistance.

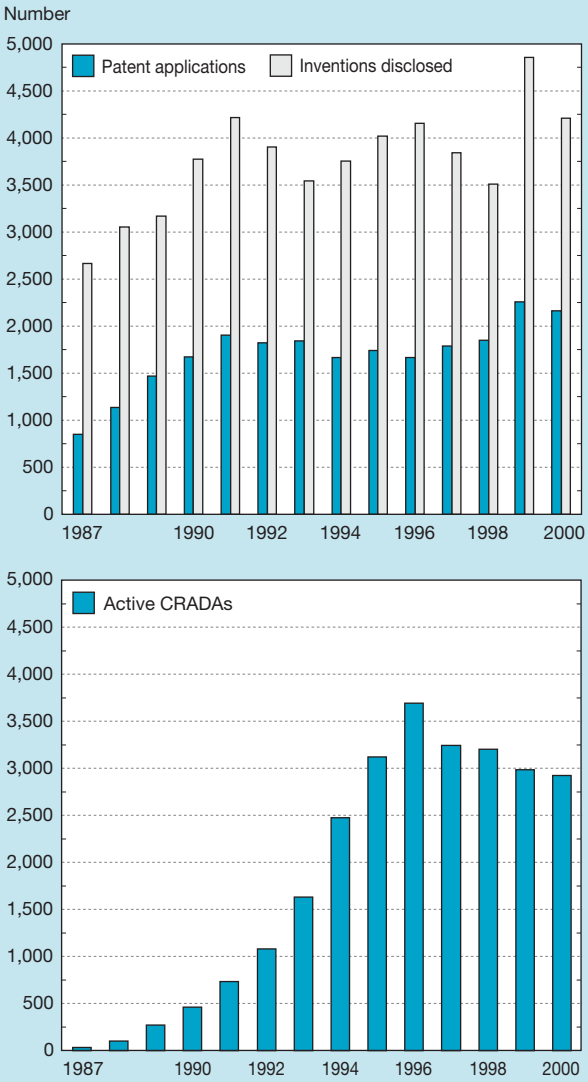
In the early 1980s, Federal technology transfer became widely regarded as a means of addressing Federal concerns about U.S. industrial strength and world competitiveness. The Stevenson-Wydler Technology Innovation Act of 1980 added technology transfer of Federally-owned or originated technology as an explicit mission of Federal laboratories. In the same year, the Bayle-Dole Act specified the authority of Federal agencies to obtain patents, grant licenses, and transfer custody of patents with the explicit purpose of promoting the utilization and marketing of inventions under Federally-funded R&D by nonprofit organizations and small businesses. Subsequent amendments repealed the restriction to grant an exclusive license only to small firms (Schacht 2000). Later in the decade, the Federal Technology Transfer Act of 1986 authorized government-owned and government-operated laboratories to enter into Cooperative Research and Development Agreements (CRADAs)[31] with private industry and gave all companies, regardless of size, the right to retain title to inventions (Schacht 2000). The 1989 passage of the National Competitiveness Technology Transfer Act extended this authority to contractor-operated labs (including DOE's FFRDCs). More recently, the Technology Transfer Commercialization Act of 2000 (Public Law 106-404) improved the ability of Federal agencies to license federally owned inventions.

[31]The statute defines CRADAs as any agreement between one or more laboratories and one or more non-Federal parties in which the government shares personnel, facilities, equipment, or other resources (but not funding) with non-Federal parties for the purpose of advancing R&D efforts consistent with the missions of the laboratories.

Data on technology transfer activities from Federal agencies are reported to the Department of Commerce and include inventions disclosed, Federally-owned patents, licenses of patented inventions, income from those patented inventions, and the number of CRADAs. In 2000, Federal agencies involved in R&D and technology transfer activities reported 4,209 invention disclosures, 2,159 patent applications, and 1,486 patents issued. (See figure 4-18 and appendix table 4-35.) Since fiscal year 1997, a total of 5,655 patents have been issued to Federal agencies.

A total of 2,924 CRADAs involving 10 Federal agencies and their laboratories were active in 2000. The largest participants by far are DOD laboratories (1,364 active CRADAS or 47 percent of the total) and DOE (687 or 23 percent). The number of active CRADAs increased rapidly in the early and

Figure 4-18.
**Federal technology transfer indicators: 1987–2000**




CRADA = Cooperative Research and Development Agreement

See appendix table 4-35.

*Science & Engineering Indicators – 2002*